

***Honors Biology***

***Lecture and Lab***

Yearlong

 Academic Year (2023/2024)

**Eligible Students:**

**Grades 9-11 (Seniors welcome):** Students should read the text and take notes summarizing what was read. They will be expected to come to class with memorized vocabulary terms and correctly use them in discussions. Students will also be writing several papers. They need to have the maturity to work independently to complete reading assignments, homework, and studying for exams.

**Please note:** Students enrolled in this course will complete a variety of laboratory experiments and write six full laboratory reports. The laboratory manual accompanying the text will contain the procedures for the experiments. A current list of supplies is available below. Students will need a compound microscope view slides they make of microbes, cells, and plant parts. Dissections will be completed in the spring semester. The laboratory supplies will need to be collected before class, and the students must be ready to conduct the experiments during organized class time. The student completing this course earns one high school course credit.

**Class Dates:** Beginning September 6, 2023, and ending May 24, 2024

**Class Times:** Mondays, Wednesdays, and Fridays; or Tuesdays, Thursdays, Fridays

**Instructor:** Tamara Davault

**Email:** davault.science@gmail.com

**Schedule for *Honors Biology:***

**Class Sessions Dates:**

**Classes will take place on Mondays, Wednesdays, and Fridays for 32 weeks, and 95 classes on the following dates\* --**

**September** (11): 6, 8, 11, 13, 15, 18, 20, 22, 25, 27, 29

**October** (13): 2, 4, 6, 9, 11, 13, 16, 18, 20, 23, 25, 27, 30

**November** (10): 1, 3, 6, 8, 10, 13, 15, 17, **[Thanksgiving Break]**, 27, 29

**December** (7): 1, 4, 6, 8, 11, 13, 15, **[Christmas Break]**

**January** (11): **[Christmas Break]**, 8, 10, 12, 15, 17, 19, 22, 24, 26, **[End 1st Semester]**, 29, 31

**February** (10): 2, 5, 7, 9, 12, 14, 16, 19, 21, 23

**March** (10): 1, 4, 6, 8, 11, 13, 15, 18, 20, 22, **[Holy Week]**

**April** (13): 1, 3, 5, 8, 10, 12, 15, 17, 19, 22, 24, 26, 29

**May** (11): 1, 3, 6, 8, 10, 13, 15, 17, 20, 22, 24, **[End 2nd Semester]**

*\*Please note that the above dates and times are the anticipated class sessions for this course. However, all dates are subject to change as the instructor's circumstances dictate (e.g., illness, family emergency). Any classes canceled by the instructor will be made up at an alternate time designated by the instructor.*

**Honors Biology Course Map:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Week | Chapter | Lecture Topic (Mon, Wed) | Lab Topic (Fri) | Assessments |
| 1 | 1 | Orientation Meeting, The Science of Biology | Scientific MethodHandbook-Using a Lab Journal |  |
| 2 | 1,2 | The History of Biogenic TheoryAtoms and Molecules | Experimental DesignHandbook-Formatting and Printing |  |
| 3 | 2 | WaterBiomolecules | Activity 1 Handbook-Writing Style |  |
| 4 |  | Review Sessions | Activity 3Handbook-Report Content | Quiz 1 |
| 5 | 3 | The Cell TheoryCell Structure and Function | Activity 8Handbook-Report Content |  |
| 6 | 3,4 | Cell MembraneEnergy in Chemical Reactions | Activity 9Handbook-Section Content | Quiz 2 |
| 7 | 4 | Cellular Respiration | Activity 11Handbook-Analyzing and Discussing |  |
| 8 |  | Review Sessions | Activity 12Handbook-Preparing Tables, Graphs, Figures | Exam 1 |
| 9 | 4 | Photosynthesis | Activity 13Handbook-Common Lab Report Deficiencies |  |
| 10 | 5 | The History of Molecular BiologyDNA Org. & Gene Expression | Activity 14 | Quiz 3 |
| 11 | 5 | The Cell CycleMitosis/Meiosis | Activity 15 | Lab Report 1-Activity 9 |
| **Thanksgiving Break** |
| 12 |  | Review Sessions | Activity 16 | Quiz 4 |
| 13 | 6 | Human Chromosomal GeneticsMendel and Classical Genetics | Activity 17 |  |
| 14 | 6,7 | Population GeneticsTaxonomy | No Lab/Lecture Review | Quiz 5 |
| **Winter Break** |
| 15 | 7 | VirusesProkaryotes | No Lab/Lecture Review | Lab Report 2-Activity 11 |
| 16 |  | Review Sessions | Activity 19 | Exam 2 |
| 17 | 7,8 | ProtistFungi | Activity 21 |  |
| 18 | 8 | Characteristics of PlantsClassification and Diversification of Plants | Activity 22 | Quiz 6 |
| 19 | 8 | Plant AnatomyPlant Physiology | Activity 23 | Lab Report 3-Activity 17 |
| 20 |  | Review Sessions | Activity 24 | Quiz 7 |
| 21 | 9 | Introduction to AnimalsInvertebrates | Activity 25 |  |
| 22 | 9,10 | ChordatesMusculoskeletal System | Activity 25 | Quiz 8 |
| 23 | 10 | Nervous SystemCirculatory System | Activity 27 | Lab Report 4-Leaf Collection |
| 24 |  | Review Sessions | Activity 28 | Exam 3 |
| 25 | 10 | Respiratory SystemDigestive System | Activity 29 |  |
| 26 | 10 | Urinary System Reproductive System | Activity 30 | Quiz 9 |
| **Holy Week** |
| 27 | 11 | What is EcologyInteractions with the Environment | Activity 31, 32 | Lab Report 5-Activity 25 |
| 28 |  | Review Sessions | Activity 33 | Quiz 10 |
| 29 | 11 | Interactions Btw Living ThingsEnvironmental Concerns | Activity 38 |  |
| 30 | 12 | The History of EvolutionMicroevolution | No Lab/Lecture Review | Quiz 11 |
| 31 | 12 | SpecificationMacroevolution | No Lab/Lecture Review | Lab Report 6-Activity 38 |
| 32 |  | Review Sessions | No Lab/Lecture Review | Final Exam |

**Office Hours:** This will be updated closer to the beginning of the semester.

**Required Course Texts:**

Lecture Textbook

* General Biology, by Heather Ayala and Katie Rogstad, Novare Science and Math
	+ ISBN 9781732638433
	+ <https://classicalacademicpress.com/collections/novare-science/products/general-biology>

Lab Textbooks

* The Apprentice's Companion for General Biology, by Heather Ayala and Katie Rogstad, Novare Science and Math
	+ ISBN 9781732638464
	+ <https://classicalacademicpress.com/collections/novare-science/products/apprentices-companion-for-general-biology>
* The Student Lab Report Handbook, 2nd Edition, by John D. Mays, Novare Science, and Math
	+ ISBN 9780988322875
	+ <https://classicalacademicpress.com/collections/novare-science/products/the-student-lab-report-handbook-2nd-edition>

Lab Material List

* The Apprentice Companion Biology Kit
	+ <https://www.homesciencetools.com/product/the-apprentices-companion-to-general-biology-lab-kit/>
* Compound Microscope (40x to 400x magnification)
* Microscope Kit
	+ https://www.homesciencetools.com/product/the-apprentices-companion-for-general-biology-microscope-kit/
* Dissection Kit
	+ https://www.homesciencetools.com/product/the-apprentices-companion-for-general-biology-dissection-kit/
* Potting soil
* Seeds
* Colored pencils
* Popsicle sticks
* Notebook

**Optional Course Texts:** Papers and essays will be submitted using basic MLA formatting guides. The *MLA Handbook for Writers of Research Papers* — 7th Edition may be helpful.

**Honors Biology Course Description:**

**Preparedness**: Biology is for 9-11th graders. (Seniors welcome).

**Content**: This course is a robust, thorough investigation into the significant areas of life science. General Biology, by Heather Ayala and Katie Rogstad, Novare Science & Math, is an inspiring and engaging text that speaks to students through quality language and thorough explanations. It builds gradually, starting with the characteristics of all living organisms and the chemistry behind their life functions. It then delves into the wonder of the cell and how it is structured and created to thrive and multiply. The second half of the text examines the unique features of the different kingdoms and their phyla and how the organ systems vary in form and function, culminating with a chapter on the human organ systems. A chapter is devoted to ecology, populations, communities, and living organisms' environments. Lastly, historical and current theories of macroevolution and microevolution and mechanisms of speciation are addressed. A repeated theme is emphasized throughout the course: science is not in the business of proclaiming truth but creating hypotheses and conducting experiments that either support or oppose those hypotheses.

**Class time** will be devoted to discussing reading assignments and practice questions, explaining complicated concepts, conducting laboratory exercises, contemplating current events in biology, instilling good scientific exploration and experimentation skills, and learning quality techniques for documenting observations and reviewing topics. On Mondays and Wednesdays, the class will focus on lecture topics. On Fridays, the course will focus on lab activities and lab reports.

**Parental Involvement**: Parents are expected to support their biology students in several ways. They are expected to

1) obtain the proper supplies required,

2) be present during laboratory exercises,

3) conduct occasional student-led conferences, and

4) encourage and support their student to academic success and help them seek help as needed.

**Mastery**: This course uses a mastery approach to prepare students for advanced biological study. This is achieved by covering fewer concepts at a deeper level. We aim to have a solid, working comprehension of these concepts and communicate them. Mastering these concepts will create a tremendous foundation upon which higher-level concepts can build in college. Regular review of important "standard concepts" throughout the year will keep topics relevant and fresh. Students will be expected to keep up with the daily workload of reading the text, taking notes, reviewing vocabulary, attending class, and completing the practice problems. This will get easier as good skills and habits are developed.

**Integration**: This course approaches science holistically, integrating history, the English language, and the epistemology of science. We will contemplate and discuss these topics during class, and students will write about them outside of class. We will consider the existence of scientific findings which may contradict biblical statements and explore meaningful, productive responses to them. We will discuss bias and how it affects science.

**Laboratory**: A good scientist must understand well-designed experimentation, the proper interpretation of results, and precise communication of their findings. Most of the experiments in this course are qualitative and promote strong observation skills. The teacher will lead the microscopy portion with pictures of prepared slides so students can find structures at home and compare theirs with the instructor. Dissections will be started in class and, if necessary, completed after class. Two quantitative experiments will be conducted, and complete reports will be written. Guidelines for lab report writing will follow The Student Lab Report Handbook by John D. Mays. This manual should be purchased this year and used as a reference through college. It instructs graphing results, grammatical requirements, hypotheses, and other components of high-quality laboratory reports.

**Projects**: Two projects will also be completed: a plant growth experiment and an ecological survey. Both projects will take several weeks to complete and require students to collect data. The plant growth experiment will have students observe the stages of life of plants and end with an experiment with the seedlings grown. The ecological survey will have students go to their local parks to keep their biome and compare it to their classmates' biome.

**NOTE**: Parents will be expected to be present during laboratory exercises to ensure their students’ safety and follow proper procedures. Together they will pre-read the activity and set up supplies before class time. Procedures will be followed during scheduled class time. Questions can be asked of the instructor during the exercise.

**Grading**: The grade will be based on several components: participation in class, quizzes, tests, projects, and laboratory reports. Grades should be visible one week after submission.

**Student Expectations: Executive Function Skills**

Scholé Academy’s Logic Program students will be expected to develop executive function skills throughout the year. Executive Function Skills speaks to a set of qualities and skillsets students can develop and hone to better approach the courses, lectures, readings, and teachers they will face in their future academic coursework.

Teachers will invariably have their requirements and skills to bring to their studies. *Generally* speaking, I believe there are five such qualities necessary for my students in various subjects, and I think they would be accepted as "good" by many other teachers.

**1. An Engaged Student:** One willing to step into the arena of class discussion, ask questions, supply answers, and generate the internal dialogue necessary to determine if what's being discussed is essential and essential to himself.

**2. Note Taking:** A student engaged with the class has been trained to note important and relevant content in an organized fashion (Cornell Notes would be a great option). His notes would then be consulted independently for application in assignments and assessments.

**3. Attention to Detail & Preparedness:** These students are ones who consistently adhere to deadlines and submission requirements, stick to style guides and codes, confirm technology is working before the start of class, be responsible for determining how to proceed after an absence, be liable for consulting his course syllabus and adjusting as the class proceeds, etc.

**4. Employ Critiques:** These students receive feedback on one of their submissions and then are sure to apply that feedback to future assignments rather than repeating mistakes. These students also glean information from the live class critiques of fellow students and note mistakes to avoid by learning from others.

**5. Initiative/Maturity:** This student would hear the teacher's comments and assess whether or not the teacher was describing his work, and then take the initiative to schedule office hours with his teacher if necessary.

**Student Expectations In Action**

Students will be expected to listen attentively and participate actively in class discussions and practices in this class. Students must arrive at class on time and complete all assigned material. The instructor will facilitate learning for the student, but the responsibility for staying up to date with classwork and assignments ultimately falls to the student.

Students who have yet to submit their homework to the appropriate Schoology assignment folder before the due date will lose points on the assignment. There will be a three-day cut-off for late work. Students turning in late positions will earn a 10% penalty for each day the assignment is late. Students will submit their work by scanning their homework pages and uploading it into the Schoology assignment window. **Photographs of completed assignments will not be accepted as they are tough to read.**

**Student Evaluation: Grading**

While pursuing Biology through Scholé Academy will be "restful" (undistracted time to study the things most worthwhile, usually with good friends in a beautiful setting), we also recognize the need to provide grades for students who will be using this course as part of their prepared college transcript. It's a delicate balance to achieve restful learning and excellent academic performance. Earning a specific grade should not overshadow achievement goals for mastery of this discipline. Biology is one type of science, and mastery in this course will strengthen a student's understanding and other science disciplines like chemistry, physics, and engineering, as well as future study in college biology. I will assign the following grades to your student's level of achievement: magna cum laude (with great praise); cum laude (with praise); satis (sufficient, satisfactory), and non satis (not sufficient). The achievement of magna cum laude (MCL) is challenging and does not necessarily correlate to a 91-100% objective grade.

Ideally, every average student working diligently should do praiseworthy work (cum laude). Those who excel beyond this expectation will be the magna cum laude students, able to teach the content back to lower students. Students who do adequate but not praiseworthy work be designated satis. Non satis means lacking sufficiency or adequacy.

Since you might be fully on board with this grading method, you will undoubtedly need to complete a college transcript with either a numeric or traditional letter grade. Traditional percentage grades will be provided and readily accessed on the Biology Schoology page. Additionally, Mrs. Davault will provide a transcript of that grade to the requesting parent at the end of the year.

**Student Evaluation: Mastery Portrait**

Mastery portrait: Students prepared to take this class are typically mid-teens--adolescents approaching young adulthood. This developmental stage is interesting, brimming with many new characteristics. It's imperative, then, that this course provides the academic components necessary to achieve mastery of the content of the class (knowledge) and skills associated with analytical thought (experimentation) and help engage the student in developing their intellectual virtues. These three aspects of the course would comprise the "learning target."

After this course cum laude, students will be able to do the following:

**Knowledge & Skills**:

• Explain the characteristics of all life forms.

• Know major classification groups, and their characteristics and use a biological key to identify organisms.

• Know the main components of the prokaryotic and eukaryotic cells and organelles contained within each.

• Describe the major chemical components of living organisms, their synthesis, and uses.

• Describe cellular respiration and how cells get their energy

• Have a working knowledge of protein synthesis, mitosis, and meiosis. Know the differences between DNA and RNA.

• Conduct genetic surveys of phenotypical traits and complete dihybrid crosses on paper.

• Describe the significant environmental cycles of water, oxygen, carbon, and nitrogen; explain energy flow through an ecosystem.

• Gain a working knowledge of the structure and function of animal organisms and their body systems. Compare one organism to another.

• Gain a working knowledge of plant organisms' structure and function and anatomic parts. Compare and contrast physiology and reproduction between plant groups.

• Learn basic microscopy and dissection skills.

• Gain superior observation skills and develop quality documentation skills with specimen collection, drawings, and the written word.

Intellectual Virtues:

• Love of what is true, good, and beautiful

• Show humility as a student and willingly receive instruction

• Demonstrate patience in understanding

• Exercise constancy in effort

• Practice perseverance in the study

• Show temperance toward their classmates and instructor

• Fight against intellectual vices like pride, dishonesty, envy, slothfulness, sensuality, irritation/impatience, and excessive ambition.

Significant advancements in the virtues plus content and scholarship will lead to the mastery designation of magna cum laude.

**Student Evaluation: Assignments, Types & Weights**

Mrs. Davault will communicate with students regarding assignment feedback and grading through the free online system, Schoology. The teacher will give students more detailed information and access to the Honors Biology course page.

Student's grades will be comprised of the following:

1. Exams: 30%
2. Quizzes: 20%
3. Lab Reports: 20%
4. Projects: 20%
5. Homework: 10%

**Student Evaluation: Academic Dishonesty**

Students will often take assessment tests and quizzes privately at home. Students are on their honor to abide by [Scholé Academy's Learning Philosophy](http://www.scholeacademy.com/student-parent-handbook/) which assumes the personal cultivation of Student-Virtues described in the Student-Parent Handbook.

Additionally, plagiarism is a serious and punishable offense. Proper citation of all sources is essential to the academic endeavor. Remember to cite any source if the information is not common knowledge or is an opinion obtained through any source. A plagiarized assignment will result in a failing grade. Students should consult their chosen style manual (see Student Expectations above) for specific directions on obtaining, quoting, and paraphrasing sources.

**The Virtual Classroom:**

We will use the free online "virtual classroom" software provided by Zoom, one of the leading companies that provide such software.  The virtual classroom will provide students with interactive audio, text chat, and an interactive whiteboard in which texts, diagrams, videos, and other media can be displayed and analyzed. We will provide students with a link (via email) that will enable students to join the virtual classroom.

Specific information regarding the technology used by Scholé Academy (including required technology) can be found by visiting the [Technology in the Classroom](http://www.scholeacademy.com/student-parent-handbook/) section of the Student-Parent Handbook.

Students will submit documents by scanning and uploading them to their personal computers, then attaching those files as .pdfs to an email. They will submit their work to the *Art of Argument* Schoology assignment page (access granted after secured enrollment).

**About the Instructor:**

**Tamara Davault** is a native Texan who loves Biology. She graduated from the University of Texas Permian Basin with B.S. degrees in Biology and Chemistry. Mrs. Davault went on to earn an M.S. in Medical Sciences from the University of North Texas Health Science Center. Since graduation, she has taught various Biology courses at several community colleges and universities in Texas. Mrs. Davault's hobbies include archery, crochet, and nature walks.